Amended Specification- Paragraph Beginning At Page 7, Line 28
With Markings To Show Changes Made

As depicted by **Figs. 4A** and **4B** of the drawings, strips 212 of the tooth section 230 are cut to a plurality of predetermined sizes and contactingly stacked to ensure metal-to-metal contact among the stacked strips so that the longest strip is located approximately at the center of the tooth section 230 and the strips 212 become shorter towards the outer edges of the group 230. This configuration defines two diametrically opposed first free ends 232 that collectively form a substantially V-shaped end of the tooth section 230. The stacked strips configured as described and as depicted by **Figs. 4A** and **4B** also define a second free end 234 of the tooth section 230 that is substantially planar and that comprises the tooth or pole 40 of the stator 200. Lines N depict directions normal to the surfaces of the amorphous ribbons comprised in tooth section 230 and back iron section 220, respectively.

[illegible]nded Specification- Paragraph Be[illegible]ning At Page 7, Line 28
With Markings To Show Changes Made

Referring to **Figs. 5 and 6**, there is shown a second embodiment of the stator 200 of the present invention. Rotor 100 is appointed to rotate as depicted a[illegible] located in the rotor and perpendicular to the plane of **Fig. 5.** Stator 200 is made up of a predetermined number of segments 250 that are generally C-shaped (when viewed in cross-section, as in **Fig. 6**) and that are arranged in abutting relation with each other in a generally cylindrical form. Each C-segment 250 is comprised of a plurality of layers of amorphous metal strips 212 that are individually cut to their respective predetermined sizes and thereafter formed to the desired shape. The strips 212 are stackingly arranged so that metal-to-metal contact is provided among the stacked amorphous metal strips 212. Two substantially planar free ends 252 are defined by each C-segment 250 that comprise, at least in part, the poles 40 of the stator 200. After being formed, the C-segments 250 are individually annealed at temperatures of about 360°C while being subjected to a magnetic field. The C-segments 250 retain their formed shape after the annealing process. Once a predetermined number of C-segments 250 are arranged to form the stator 200, as depicted in **Fig. 5**, the stator 200 is coated or impregnated with an epoxy resin 202 to hold the C-segments 250 together, and also to provide mechanical strength and support to the stator 200 during use in the electric motor 20. The epoxy resin 202 optionally covers the two free ends 252 of the C-segment 250. Alternatively, or in addition to the epoxy resin 202, an inner restraining band 206 may be used to secure the C-segments 250 in place and to supply the desired additional structural rigidity to the stator 200. The band 206 may secure the teeth or poles 40, the sections between the poles, or both, provided that the inner restraining band 206 does not significantly increase the space required between the rotor 100 and the stator teeth 40, i.e. does not significantly increase the air gap 50. An outer restraining band 204, preferably made of steel, is provided peripherally about the stator 200 to secure the plurality of C-segments 250 in generally circular abutting relation with each other. The outer band 204 strengthens the overall construction of the stator 200 and provides an additional level of safety in the case of catastrophic and destructive motor failure by preventing loose motor parts from breaking loose and causing injury to persons located nearby.

CLAIMS

What is claimed is:

1. An amorphous metal stator for a radial flux motor having a rotor, said stator comprising a plurality of segments, each segment comprising a plurality of layers of amorphous metal strips, each of which has a top and a bottom surface and is oriented such that (i) a line normal to either of said surfaces at substantially any point thereon is substantially perpendicular to the axis of rotation of said rotor, and (ii) when traversing said segment, said flux crosses one air gap.

2. An amorphous metal stator as recited by claim 1, each of said segments further comprising:
   a) a back-iron section having a first free end and comprising a plurality of contactingly stacked layers of amorphous metal strips; and
   b) a tooth section having a first free end and comprising a plurality of contactingly stacked layers of amorphous metal strips;

   said back-iron section and said tooth section being arranged such that said first free end of said back-iron section contactingly engages said first free end of said tooth section and wherein an air gap is defined between said respective first free ends.

3. An amorphous metal stator as recited by claim 2, further comprising:
   c) an inner restraining means for securing said tooth section against being drawn out of engagement with said back-iron section; and
   d) an outer restraining means for securing said plurality of segments in generally circular abutting relation to each other.

4. An amorphous metal stator as recited by claim 3, wherein said inner restraining means comprises a bonding material that is applied to a substantial portion of

said stator to provide each of said segments with increased mechanical strength, and said outer restraining means comprises a steel band provided peripherally about said stator.

5. An amorphous metal stator as recited by claim 3, wherein said inner restraining means comprises a bonding material that is applied to a substantial portion of said stator, excluding said respective first free ends of said back-iron and tooth sections.

6. An amorphous metal stator as recited by claim 4, wherein said bonding material is an epoxy resin.

7. An amorphous metal stator as recited by claim 3, wherein said inner restraining means partly comprises a bonding material and partly comprises a metal band.

8. An amorphous metal stator as recited by claim 2, said back-iron section being generally arcuate and said tooth section being generally straight.

9. An amorphous metal stator as recited by claim 1, each of said amorphous metal strips having a composition defined essentially by the formula: $M_{70-85}\ Y_{5-20}\ Z_{0-20}$, subscripts in atom percent, where "M" is at least one of Fe, Ni and Co, "Y" is at least one of B, C and P, and "Z" is at least one of Si, Al and Ge; with the provisos that (i) up to 10 atom percent of component "M" can be replaced with at least one of the metallic species Ti, V, Cr, Mn, Cu, Zr, Nb, Mo, Ta, Hf, Ag, Au, Pd, Pt, and W; (ii) up to 10 atom percent of components (Y + Z) can be replaced by at least one of the non-metallic species In, Sn, Sb and Pb; and (iii) up to about one (1) atom percent of the components (M + Y + Z) can be incidental impurities.

10. An amorphous metal stator as recited by claim 9, wherein each of said amorphous metal strips has a composition containing at least 70 atom percent Fe, at least 5 atom percent B, and at least 5 atom percent Si, with the proviso

that the total content of B and Si is at least 15 atom percent.

11. An amorphous metal stator as recited by claim 10 wherein each of said amorphous metal strips has a composition defined essentially by the formula $Fe_{80}B_{11}Si_{9}$.

12. An amorphous metal stator as recited by claim 9, said amorphous metal strips having been heat treated to form a nanocrystalline microstructure therein.

13. An amorphous metal stator as recited by claim 12, wherein each of said amorphous metal strips has a composition defined essentially by the formula $Fe_{100-u-x-y-z-w}R_uT_xQ_yB_zSi_w$, wherein R is at least one of Ni and Co, T is at least one of Ti, Zr, Hf, V, Nb, Ta, Mo, and W, Q is at least one of Cu, Ag, Au, Pd, and Pt, u ranges from 0 to about 10, x ranges from about 3 to 12, y ranges from 0 to about 4, z ranges from about 5 to 12, and w ranges from 0 to less than about 8.

14. An amorphous metal stator as recited by claim 12, wherein each of said amorphous metal strips has a composition defined essentially by the formula $Fe_{100-u-x-y-z-w}R_uT_xQ_yB_zSi_w$, wherein R is at least one of Ni and Co, T is at least one of Ti, Zr, Hf, V, Nb, Ta, Mo, and W, Q is at least one of Cu, Ag, Au, Pd, and Pt, u ranges from 0 to about 10, x ranges from about 1 to 5, y ranges from 0 to about 3, z ranges from about 5 to 12, and w ranges from about 8 to 18.

15. An amorphous metal stator as recited by claim 1, said stator having a core loss less than "L" when operated at an excitation frequency "f" to a peak induction level B_{max} wherein L is given by the formula $L = 0.0074\, f\, (B_{max})^{1.3} + 0.000282\, f^{1.5}\, (B_{max})^{2.4}$, said core loss, said excitation frequency and said peak induction level being measured in watts per kilogram, hertz, and teslas, respectively.

16. An amorphous metal stator as recited by claim 15, said stator having a core-loss less than or approximately equal to 1 watt-per-kilogram of amorphous

metal material when operated at a frequency of approximately 60 Hz and a flux density of approximately 1.4T.

17. An amorphous metal stator as recited in claim 15, said stator having a core-loss of less than or approximately equal to 12 watts-per-kilogram of amorphous metal material when operated at a frequency of approximately 1000 Hz and a flux density of approximately 1.0T.

18. An amorphous metal stator as recited in claim 15, said stator having a core-loss of less than or approximately equal to 70 watts-per-kilogram of amorphous metal material when operated at a frequency of approximately 20,000 Hz and a flux density of approximately 0.30T.

19. An amorphous metal stator as recited in claim 1, each of said segments having been subjected to a heat treatment comprising a heating and a cooling portion.

20. An amorphous metal stator as recited in claim 19, a magnetic field having been applied to each of said segments during at least the cooling portion of the heat treatment thereof.

21. An amorphous metal stator as recited in claim 19, said heat treatment having been carried out in a batch or continuous annealing oven

22. An amorphous metal stator for a radial flux motor having a rotor, said stator comprising a plurality of segments, each segment having a plurality of layers of amorphous metal strips, each of which has a top and a bottom surface and is oriented such that (i) a line normal to either of said surfaces at substantially any point thereon is substantially perpendicular to the axis of rotation of said rotor, and (ii) said flux traverses said segment without crossing an air gap, said stator further comprising:

a) an inner restraining means for protecting and strengthening at least said tooth section; and

b) an outer restraining means for securing said plurality of segments in generally circular abutting relation to each other.

23. An amorphous metal stator as recited by claim 22, wherein said inner restraining means comprises a bonding material that is applied to a substantial portion of said stator and that provides each of said segments with increased mechanical strength and wherein said outer restraining means comprises a steel band provided peripherally about said stator.

24. An amorphous metal stator as recited by claim 23, wherein said bonding material is an epoxy resin.

25. An amorphous metal stator as recited by claim 22, wherein said inner restraining means partly comprises a bonding material and partly comprises a metal band.

26. An amorphous metal stator for a radial flux motor having a rotor, said stator comprising a plurality of segments, each segment having a plurality of layers of amorphous metal strips, each of which has a top and a bottom surface and is oriented such that (i) a line normal to either of said surfaces at substantially any point thereon is substantially perpendicular to the axis of rotation of said rotor, and (ii) said flux traverses said segment without crossing an air gap, said stator having a core loss less than "L" when operated at an excitation frequency "f" to a peak induction level B_{max} wherein L is given by the formula $L = 0.0074\, f\, (B_{max})^{1.3} + 0.000282\, f^{1.5}\, (B_{max})^{2.4}$, said core loss, said excitation frequency and said peak induction level being measured in watts per kilogram, hertz, and teslas, respectively.

27. An amorphous metal stator as recited in claim 26, said stator further comprising:

a) an inner restraining means for protecting and strengthening at least said tooth section; and

b) an outer restraining means for securing said plurality of segments in generally circular abutting relation to each other.

28. An amorphous metal stator as recited in claim 26, each of said segments having been subjected to a heat treatment comprising a heating and a cooling portion.

29. An amorphous metal stator as recited in claim 28, a magnetic field being applied to each of said segments during at least the cooling portion of the heat treatment thereof.

30. An amorphous metal stator as recited in claim 28, said heat treatment being carried out in a batch or continuous annealing oven.

31. An amorphous metal stator as recited by claim 26, said stator having a core-loss less than or approximately equal to 1 watt-per-kilogram of amorphous metal material when operated at a frequency of approximately 60 Hz and a flux density of approximately 1.4T.

32. An amorphous metal stator as recited in claim 26, said stator having a core-loss of less than or approximately equal to 12 watts-per-kilogram of amorphous metal material when operated at a frequency of approximately 1000 Hz and a flux density of approximately 1.0T.

33. An amorphous metal stator as recited in claim 26, said stator having a core-loss of less than or approximately equal to 70 watts-per-kilogram of amorphous metal material when operated at a frequency of approximately 20,000 Hz and a flux density of approximately 0.30T.

34. An amorphous metal stator as recited in claim 26, wherein each of said strips has a composition defined essentially by the formula: $M_{70-85}\ Y_{5-20}\ Z_{0-20}$, subscripts in atom percent, where "M" is at least one of Fe, Ni and Co, "Y" is

at least one of B, C and P, and "Z" is at least one of Si, Al and Ge; with the provisos that (i) up to 10 atom percent of component "M" can be replaced with at least one of the metallic species Ti, V, Cr, Mn, Cu, Zr, Nb, Mo, Ta, Hf, Ag, Au, Pd, Pt, and W; (ii) up to 10 atom percent of components (Y + Z) can be replaced by at least one of the non-metallic species In, Sn, Sb and Pb; and (iii) up to about one (1) atom percent of the components (M + Y + Z) can be incidental impurities.

35. A brushless radial flux DC motor comprising:

a) an amorphous metal stator and a rotor disposed for rotation therewithin, said stator comprising a plurality of segments, each segment comprising a plurality of layers of amorphous metal strips, each of which has a top and a bottom surface and is oriented such that (i) a line normal to either of said surfaces at substantially any point thereon is substantially pe pendicular to the axis of rotation of said rotor, and (ii) when traversing said segment, said flux crosses one air gap; and

b) means for supporting said stator and said rotor in predetermined positions relative to each other.

36. A brushless radial flux DC motor comprising:

a) an amorphous metal stator and a rotor disposed for rotation therewithin, said stator comprising a plurality of heat-treated segments, each segment comprising a plurality of layers of amorphous metal strips, each of which has a top and a bottom surface and is oriented such that (i) a line normal to either of said surfaces at substantially any point thereon is substantially perpendicular to the axis of rotation of said rotor, and (ii) said flux traverses said segment without crossing an air gap, and said stator having a core loss less than "L" when operated at an excitation frequency "f" to a peak induction level B_{max} wherein L is given by the formula $L = 0.0074\, f\, (B_{max})^{1.3} + 0.000282\, f^{1.5}\, (B_{max})^{2.4}$, said core loss, said excitation frequency and said peak induction level

... in watts per kilogram, hertz, and teslas, respectively;

and

b) means for supporting said stator and said rotor in predetermined positions relative to each other.

As depicted by **Figs. 4A** and **4B** of the drawings, strips 212 of the tooth section 230 are cut to a plurality of predetermined sizes and contactingly stacked to ensure metal-to-metal contact among the stacked strips so that the longest strip is located approximately at the center of the tooth section 230 and the strips 212 become shorter towards the outer edges of the group 230. This configuration defines two diametrically opposed first free ends 232 that collectively form a substantially V-shaped end of the tooth section 230. The stacked strips configured as described and as depicted by **Figs. 4A** and **4B** also define a second free end 234 of the tooth section 230 that is substantially planar and that comprises the tooth or pole 40 of the stator 200. Lines N depict directions normal to the surfaces of the amorphous ribbons comprised in tooth section 230 and back iron section 220, respectively.

Referring to **Figs. 5 and 6**, there is shown a second embodiment of the stator 200 of the present invention. Rotor 100 is appointed to rotate as depicted about an axis centrally located in the rotor and perpendicular to the plane of **Fig. 5**. Stator 200 is made up of a predetermined number of segments 250 that are generally C-shaped (when viewed in cross-section, as in **Fig. 6**) and that are arranged in abutting relation with each other in a generally cylindrical form. Each C-segment 250 is comprised of a plurality of layers of amorphous metal strips 212 that are individually cut to their respective predetermined sizes and thereafter formed to the desired shape. The strips 212 are stackingly arranged so that metal-to-metal contact is provided among the stacked amorphous metal strips 212. Two substantially planar free ends 252 are defined by each C-segment 250 that comprise, at least in part, the poles 40 of the stator 200. After being formed, the C-segments 250 are individually annealed at temperatures of about 360°C while being subjected to a magnetic field. The C-segments 250 retain their formed shape after the annealing process. Once a predetermined number of C-segments 250 are arranged to form the stator 200, as depicted in **Fig. 5**, the stator 200 is coated or impregnated with an epoxy resin 202 to hold the C-segments 250 together, and also to provide mechanical strength and support to the stator 200 during use in the electric motor 20. The epoxy resin 202 optionally covers the two free ends 252 of the C-segment 250. Alternatively, or in addition to the epoxy resin 202, an inner restraining band 206 may be used to secure the C-segments 250 in place and to supply the desired additional structural rigidity to the stator 200. The band 206 may secure the teeth or poles 40, the sections between the poles, or both, provided that the inner restraining band 206 does not significantly increase the space required between the rotor 100 and the stator teeth 40, i.e. does not significantly increase the air gap 50. An outer restraining band 204, preferably made of steel, is provided peripherally about the stator 200 to secure the plurality of C-segments 250 in generally circular abutting relation with each other. The outer band 204 strengthens the overall construction of the stator 200 and provides an additional level of safety in the case of catastrophic and destructive motor failure by preventing loose motor parts from breaking loose and causing injury to persons located nearby.